IMPORTANT: *The booklet provides all FREMO participants with* ***different module-systems*** *and* ***era-neutral proven good practice*** *for direct application during FREMO meetings.* ***Any deviations and specific details are determined by the respective module system group or the meeting's organizing team.***

Note: *British railway (North American railroad in brackets) terminology is used in this booklet.* ***In case of any doubt or misunderstanding, the German version is authoritative. For clarification of German railway operating rules and procedures, please consult an experienced FREMO member.***

Notes:

Further Reading (only in German)

For everyone who wants to deepen or refresh their understanding of signals and markings used on the German railways:

- **Regulations (DB InfraGO):**
  - **Ril 301 Signalbuch**
- **Online Resources:**
  - Website TF-Ausbildiung.de > **Signalbuch-Online** (Signal Book Online)
  - Website Kleinbahnwiki.de > **Betrieb** (Operations and Procedures)
  - Website Stellwerke.de > **Signalsysteme** (Signal Systems Overview)
- **Reference Books:**
  - Hausmann, Anita / Enders, Dirk H.: *Grundlagen des Bahnbetriebs*, 3. Auflage, 2017, Bahn Fachverlag, ISBN 978-3-943214-16-1
  - Krebs, Jürgen: Blocksignal frei: Band 1 – 1835 bis 1945 Aspekte des Bahnbetriebs im Spiegelbild zwischen Organisation und Technik in mehr als 180 Jahren deutscher Eisenbahn, 1. Auflage, 2021, Eigenverlag, ISBN 978-3-981937-12-1
  - Krebs, Jürgen: *Blocksignal frei: Band 2 – nach 1945 Aspekte des Bahnbetriebs im Spiegelbild zwischen Organisation und Technik in mehr als 180 Jahren deutscher Eisenbahn*, 1. Auflage, 2024, Eigenverlag, ISBN 978-3-981937-14-5
  - Carstens, Stefan: *MIBA-Report: Signale 2 - Signalbegriffe, Anordnung und Bauformen, Haupt- und Vorsignale, Signalverbindungen*, 2. Auflage, 2007, Verlagsgruppe Bahn, ISBN 978-3-896102-36-2
  - Carstens, Stefan: *MIBA-Report: Signale 3 - Zusatz-, Sperr- und Langsamfahrsignale, Kennzeichen, Nebensignale, Läute- und Pfeiftafeln*, 2. Auflage, 2009, Verlagsgruppe Bahn, ISBN 978-3-896102-38-6

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FREUNDESKREIS FREMO EUROPÄISCHER MODELLBAHNER

SIGNAL BOOK 301

Deutsche Bahn

DB

Author Ghim Meng (Jimmy) Low

FREMO Version 1.0 November 2025

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FREMO Signal Book 301
Deutsche Bahn

Introduction

This FREMO Signal Book 301 (SB–DB AG) summarizes selected signals and markers of Deutsche Bahn AG according to Directive 301 (Status 2025). The focus lies on the train driver (engineer)'s (*Triebfahrzeugführer*) perspective: *Which signals appear within the FREMO arrangement, and how must they be observed in operation?*

Detailed technical descriptions of signal aspects, applications, and areas of validity are contained in the official regulations. This FREMO manual does not replace the official directive but provides a practice-oriented selection for model railway operation.

Part 1: Train Movements

Section 1: Main (Home) and Distant (Approach) Signals (H/V) and Combined Signals (Ks) on Lines

Distant (approach) (Vr) and main (home) signals (Hp) are the classic signals on railway lines. They govern and protect train movements. Ks signals combine the functions of main and distant signals in a single signal unit.

Semaphore Signal | **Light Signal** | **Combined Signal**



Signal Vr 1: Expect "Proceed"

Driver (engineer)'s action:

- The next main (home) signal shows Hp 1 (Proceed).



Signal Hp 1 / Ks 1: Proceed

Driver (engineer)'s action:

- The main (home) signal shows Hp 1 or Ks 1 (Proceed). **Maintain current speed.**



Signal Vr 2: Expect "Proceed at reduced speed"

Driver (engineer)'s action:

- The next main (home) signal shows Hp 2 (Proceed at reduced speed), possibly in combination with Signal Zs 3v (speed indicator, numerals 1–6 = 10–60 km/h). **Reduce speed in good time.**



Signal Hp 2: Proceed at reduced speed

Driver (engineer)'s action:

- The main (home) signal shows Hp 2 (Proceed at reduced speed), possibly in combination with additional signal Zs 3 (numerals 1–6 = 10–60 km/h.
- The driver (engineer) **must reduce speed** so that the train can **safely pass through diverging points (switches).**



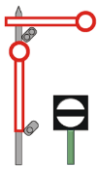
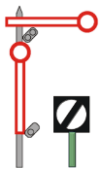
Signal Vr 0 / Ks 2: Expect "Stop"

Driver (engineer)'s action:

- The next main (home) signal shows Hp 0 (Stop). **Reduce speed in good time; observe braking distance.**

Section 16: Signal Hp 0 and Protection Signals Sh 0 / Sh 1

When main (home) and protection signals (Sh) are located at the same position, the Sh signals supplement or modify the meaning of the main (home) signal.

No passing permitted.


Shunting (switching) movements may pass the signal on instruction.

Hp 0 (Stop) or Sh 0 (Stop for all movements)

Hp 0 (Stop) with Sh 1 (Proceed for shunting (Yard Proceed))

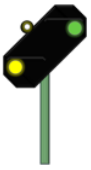
Driver (engineer)'s action:

- If the main (home) signal shows Hp 0 (Stop) combined with Signal Sh 1, the driver (engineer) may pass the signal only on instruction from the shunting supervisor or signaller (operator) (*Fahrdienstleiter*).
- If combined with Signal Sh 0, the driver (engineer) must stop.
- **Train movements may never pass a main signal showing "Stop"**, even when Signal Sh 1 is displayed.

Section 17: Distant (Approach) Signals and Distant (Approach) Signal Repeaters

If multiple signals are located at the same position, the following rules apply:

- A distant signal without a distant (approach) signal board (Ne 2) is a distant (approach) signal repeater.
- The distant (approach) signal repeater repeats the indication of the preceding distant (approach) signal when the braking distance between it and the main (home) signal is insufficient.

Distant (Approach) Signal Vr 2
Expect "Proceed at reduced speed"

Distant (Approach) Signal Repeater Vr 2
Repetition of previous aspect

Driver (engineer)'s action:

- The driver (engineer) observes the indication of the repeater exactly as that of the original distant (approach) signal.
- Continue **braking or reducing speed** as necessary until the following main (home) signal is visible or reached.

Graphic Sources:

- *Eisenbahn-Bundesamt (EBA) – Compilation of regulations of the Eisenbahn-Signalordnung 1959 (ESO 1959), including signals of temporary validity and implementation instructions. Valid for the Federal Railways network (EdB). Issued by the Federal Railway Authority, Division 333, status 13.12.2020.*
- *Gustav Richard – Graphics under Creative Commons Attribution License (reuse permitted).*
- *Tf-Ausbildung.de – Courtesy of Sven Thaler.*
- *Own illustrations – Supplementary and schematic graphics created for the FREMO Signal Books 301.*

Section 13: Indication of Lever Weights on Mechanically Operated Local Points (Switches)

The colour marking of lever weights indicates whether a mechanically operated local point (switch) is in its normal position.

Point (Switch) in normal position

Driver (engineer)'s action:

- Point (Switch) lies in its normal position (marked "+" in track diagram).

Point (Switch) not in normal position

Driver (engineer)'s action:

- Point (Switch) must be returned to its normal position.

No normal position required

Driver (engineer)'s action:

- Point (Switch) need not be returned to normal.

Change only with permission of pointsman (Weichenwärter)

Driver (engineer)'s action:

- Point (Switch) may be operated only with the pointsman's consent. After use, return to normal position.

Part 7: Miscellaneous

Section 14: Overhead Line Signals (El)

Overhead line signals (El) indicate the condition or special features of the electrical overhead contact line. They are mainly used on electrified lines to inform train crews and staff about the operating state of the catenary.

Form Signal

Signal El 6: Stop for vehicles with raised pantographs!

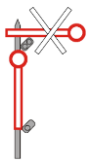
Driver (engineer)'s action:

- Electric locomotives or EMUs with raised pantographs **must stop — continuing is prohibited!**
- Continuing with pantograph raised may cause damage to the overhead line or pantograph.

Part 8: Combined and Invalid Signals

Section 15: Invalid Signals

An invalid signal is temporarily or permanently out of service and has no operational meaning. A signal is invalid if, for example, it is covered by a white cross (X) with black border, veiled, turned away, clearly removed, or otherwise disabled.



Semaphore main (home) signal invalid

Main (home) signal invalid, distant (approach) signal valid

Both main (home) and distant (approach) signal invalid

Driver (engineer)'s action:

- Invalid signals **may be ignored — but only if clearly marked as invalid**.
- In case of **doubt or uncertainty**, always inform the signaller (operator) (*Fahrdienstleiter (Fdl)*) or train dispatcher (*Zugleiter (Zl)*).
- If the main (home) signal is invalid but the distant (approach) signal is valid — the distant (approach) signal applies (e.g. "Expect stop").
- If both are invalid — the signaller (operator) decides whether and how the train may proceed (by written order or verbal instruction).

Semaphore Signal | **Light Signal** | **Combined Signal**

Signal Hp 0: Stop

Driver (engineer)'s action:

- **The train must stop before the signal!** Only when Signal Sh 1 is additionally shown may a shunting (switching) movement pass.
- If the main (home) signal showing Hp 0 (Stop) is defective or out of service, **Order (Befehl) A ("Passing a stop signal") may be applied.**
- When the order is given verbally by the signaller (operator), the driver (engineer) must repeat the exact wording to prevent misunderstanding.

Section 2: Auxiliary Signals (Ne)

Auxiliary signals supplement main (home) and distant (approach) signals or replace them where a complete signal installation is not present.

Form Signal

Signal Ne 2: Distant (Approach) Signal Board

Driver (engineer)'s action:

- The driver (engineer) expects that a main, block, or protection signal will follow shortly.

Signal Ne 3: Distant (Approach) Signal Marker Boards

Driver (engineer)'s action:

- Marks the approach to a distant (approach) signal. The driver (engineer) **prepares to reduce speed or stop** at the upcoming main (home) signal.

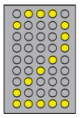
Signal Ne 4: Displacement (Offset) Board ((Chequerboard)

Driver (engineer)'s action:

- The driver (engineer) pays attention to the **unusual position** of the main (home) signal (usually placed on the right-hand side of the track).
- **Exceptions** exist for certain signals (e.g. shunting signals such as Ra 10 – Shunting Limit Board) that may be installed on the left-hand side)

Section 3: Supplementary (Marker) Signals (Zs)

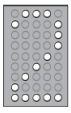
Additional supplementary (marker) signals (Zs) supplement main (home) signals. They provide extra operating instructions or modify the effect of the main (home) signal.



Signal Zs 3v: Speed Advance Indicator

Driver (engineer)'s action:

- The next Zs 3 signal will display the indicated speed (numeral × 10 km/h). **Adjust speed in good time.**



Signal Zs 3: Speed Indicator

Driver (engineer)'s action:

- **From this signal onward**, in the following point (switch) area, only the indicated speed (numeral × 10 km/h) may be observed.

Section 4: Reduced Speed (Approach Medium) Signals (Lf)

Reduced Speed (Approach Medium) signals (Lf) prescribe or announce reduced speeds. They are mainly found in sections with restrictions (e.g. points, bridges, construction sites, tight curves).

Temporary Speed Restrictions:

Form Signal

Signal Lf 1: Reduced Speed Warning Board
Driver (engineer)'s action:
- The driver (engineer) must **reduce speed** to the value shown (numeral 1–9 × 10 km/h).

Signal Lf 2: Start Board
Driver (engineer)'s action:
- **From this point onward**, the reduced-speed section announced in the timetable or by signal applies. **Reduce speed accordingly.**

Signal Lf 3: End Board
Driver (engineer)'s action:
- **From this point**, the train may **accelerate again** to the permissible timetable speed.

Permanent Speed Restrictions:

Signal Lf 6: Speed Advance Warning Signal
Driver (engineer)'s action:
- **From Signal Lf 7 onward**, the driver (engineer) may travel at the indicated speed (numeral × 10 km/h).

Signal Lf 7: Speed Restriction Signal
Driver (engineer)'s action:
- **From this point**, only the indicated speed (numeral × 10 km/h) is permitted.

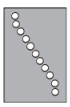
Section 5: Supplementary (Marker) Signals (Zs)

Supplementary (marker) signals (Zs) supplement main (home) (Hp) or combined signals (Ks). They provide additional operational instructions or modify the meaning or effect of the associated main signal.

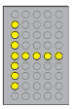
Form Signal | **Light Signal**

Signal Zs 2v: Route Advance Indicator
Driver (engineer)'s action:
- The next additional signal (Zs 2) will display the route indicator for the shown route or designated track line.

Signal Zs 2: Route Indicator
Driver (engineer)'s action:
- The main (home) signal applies to the indicated route or named track.

Signal Zs 6: Wrong-line (Wrong-main) Indicator
Driver (engineer)'s action:
- The route leads onto the opposite track (left-hand running).

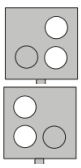
Signal Zs 13: Dead-End (Stub) Track and Early Stop Indicator
Driver (engineer)'s action:
- **Significantly reduce speed.**

Part 6: Points (Switches)

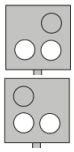
Section 12: Point (Switch) Signals (Wn)

Point (Switch) signals indicate the position of points (switches). They inform the driver (engineer) which route will be taken.

Form Signal | **Light Signal**

Signal Wn 1: Straight route
Driver (engineer)'s action:
- The driver (engineer) continues on the straight track.

Signal Wn 2: Diverging route
Driver (engineer)'s action:
- The driver (engineer) follows the diverging route.

Viewed from the frog; for simple or inside-curved turnouts
Driver (engineer)'s action:
- The driver (engineer) follows the diverging route.

Viewed from the frog; for simple or inside-curved turnouts
Driver (engineer)'s action:
- The driver (engineer) follows the diverging route.


Signal Wn 3: Double slip point (switch) (DKW) – Straight, left to right
Driver (engineer)'s action:
- Train runs straight through the DKW, left to right.


Signal Wn 4: Double slip point (switch) (DKW) – Straight, right to left
Driver (engineer)'s action:
- Train runs straight through the DKW, right to left.


Signal Wn 5: Double slip point (switch) (DKW) – Curved, left to left
Driver (engineer)'s action:
- Train passes through DKW on curved route, left to left.


Signal Wn 6: Double slip point (switch) (DKW) – Curved, right to right
Driver (engineer)'s action:
- Train passes through DKW on curved route, right to right.

Note: *The following signals are acoustic or optical and can only be used if the locomotive is equipped with a sound function.*

Signal Bü 4: Whistle Board

Driver (engineer)'s action:

- The driver (engineer) must sound the horn for **approximately 3 seconds**.

Signal Bü 5: Bell Board

Driver (engineer)'s action:

- The driver (engineer) must ring the bell.

Abs. 11: Protection Signals (Sh)

Protection signals (Sh) secure shunting movements and train operations in stations or sidings. They indicate whether a track section may be entered or must be protected.

Signal Sh 0: Stop!

Driver (engineer)'s action:

- **The driver (engineer) must stop immediately** — no further movement allowed.

Signal Sh 1: Proceed for shunting (Yard Proceed)

Driver (engineer)'s action:

- This signal permits **shunting (switching) movements to pass**, even if an associated main (home) signal shows Hp 0 (Stop).

Signal Sh 2: Stop Signal

Driver (engineer)'s action:

- **The driver (engineer) must stop.**

Signal Sh 1: Circular Hand Signal – Stop immediately!

- **Execution:** With flag – move a white-red-white flag in a circular motion.

Driver (engineer)'s action:

- **The driver (engineer) must stop immediately!**
- If it is uncertain whether the signal was observed, give Signal Sh 5.

Note: *The following signal may only be used if the locomotive has a sound function.*

Signal Sh 5: Horn or Whistle Signal

- **Execution:** With horn or whistle – several times three short tones in quick succession.

Driver (engineer)'s action:

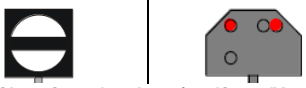
- **The driver (engineer) must stop immediately!** Serves as replacement or reinforcement of the circular hand signal Sh 1.

Part 2: Shunting (Switching) Duty

Section 6: Shunting (Switching) Signals (Ra)

Shunting (switching) signals (Ra) govern shunting (switching) movements only within stations and sidings (spurs). They do not apply to train movements on open line sections.

Form Signal | **Light Signal**



Signal Sh 0: Stop for shunting (Stop (Yard))

Driver (engineer)'s action:

- **The driver (engineer) must stop immediately** — no further movement allowed

Signal Sh 1: Proceed for shunting (Yard Proceed)

Driver (engineer)'s action:

- This signal permits **shunting (switching) movements to pass**, even if an associated main (home) signal shows Hp 0 (Stop).

Signal Wn 7: Derail Device Lifted

Driver (engineer)'s action:

- The track may be used.

Signal Ra 11: Shunting Waiting (Stop and Wait) Board

Driver (engineer)'s action:

- **The driver (engineer) waits for authorization to begin the shunting (switching) movement.** Without the consent of the pointsman or signaller (operator) (*Fahrdienstleiter*), the train may not proceed. Authorization may be given by raising an arm, Order (Befehl) A ("Passing a stop signal"), white light (indicator lamp) on the Ra 11 signal.

Signal Ra 10: Shunting Limit Board

Driver (engineer)'s action:

- Shunting (switching) beyond this board is not permitted. **The driver (engineer) must stop at this point.**

Signal Ra 12: Boundary Marker

Driver (engineer)'s action:

- The driver (engineer) must not pass the boundary marker.

Note: *The following signals are acoustic or optical. They can only be used if the locomotive is equipped with a sound function.*

Signal Ra 1: Move Away!

Execution:

- **With whistle or horn:** One long tone.
- **With arm:** Vertical arm movement, from top to bottom.

Driver (engineer)'s action:

- The driver (engineer) moves the shunting (switching) movement away from the signalman.

Signal Ra 2: Come Here!

Execution:

- **With whistle or horn:** Two moderately long tones.
- **With arm:** Slow horizontal arm movement side to side.

Driver (engineer)'s action:

- The driver (engineer) moves slowly toward the signalman.

Signal Ra 3: Push!

Execution:

- **With whistle or horn:** Two short tones in quick succession.
- **With arm:** Both arms raised forward, hands brought together.

Driver (engineer)'s action:

- The driver (engineer) pushes the vehicles for coupling or uncoupling. After this, the movement must stop — even without an explicit stop order.

Signal Ra 5: Stop!

Execution:

- **With whistle or horn:** Three short tones in quick succession.
- **With arm:** Circular arm movement.

Driver (engineer)'s action:

- The shunting (switching) movement **must stop immediately!**

Part 3: Other Signals (So) on Main Lines or Non-Federal Railways (NE)

Section 7: Auxiliary Signals (Ne)

Other signals are used on main and branch lines and by non-federal railways (NE) operating under train-dispatcher-controlled operation (*Zugleitbetrieb (ZLB)*). They regulate train movements at stations or halts without extensive main signalling.

Form Signal

Signal Ne 1: Stop (Train Order Stop) Board (Halt for Permission)

Driver (engineer)'s action:

- The driver (engineer) must stop before the trapeze board (Ne 1) if this is noted in the working timetable or ordered by the train dispatcher.
- After stopping, the driver (engineer) waits for authorisation to enter from the train dispatcher (*Zugleiter*) or signaller (operator) (*Fahrdienstleiter*) — either verbally, by written order (Befehl), or by a visible signal (e.g. raised arm or Signal Zp 11 "Come").

Signal Ne 6: Stopping Point Board

Driver (engineer)'s action:

- The driver (engineer) prepares for a scheduled stop at the platform and reduces speed accordingly.

Signal Ne 5: Stop Board (Stop Marker)

Driver (engineer)'s action:

- Stop the train at the H-board (Ne 5). If necessary, move forward slightly, but do not pass the board.

Part 4: Train Crew

Section 8: Signals for Drivers (Zp)

Zp signals are directed specifically to the train driver (engineer) (*Triebfahrzeugführer*). They provide instructions for special operational situations.

Note: *In FREMO operation, these signals can only be used when the locomotive is equipped with a sound function.*

Signal Zp 1: Attention (Acknowledge) Signal

- **Execution:** With horn – one moderately long tone.

Driver (engineer)'s action:

- The driver (engineer) gives this signal to attract attention.
- Use the horn when: persons are on or near the track, a level crossing appears unsafe, or to acknowledge an operational instruction, e.g. departure or through-passage order (Signal Zp 9).

Signal Zp 5: Emergency Signal

- **Execution:** With whistle – two moderately long tones.

Driver (engineer)'s action:

- **Stop immediately! Set controller to zero. Apply brakes fully!**

Signal Zp 6: "Come"

- **Execution:** With horn or light – one long, one short, one long tone (or corresponding light pattern).

Driver (engineer)'s action:

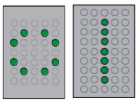
- The driver (engineer) is being called or receives permission to enter a station without an entry signal under train-dispatcher-controlled operation (*Zugleitbetrieb*). When instructed to enter, proceed slowly into the station (see also Signal Ne 1 – Stop (Train Order Stop) Board)

Section 9: Signals for Train Guard (Conductor) (Zp)

Zp signals for train guards (conductors) authorize departure or through-passage or are used by signalmen to regulate movement.

Form Signal

Light Signal



Signal Zp 9: Departure / Through-passage Order

Driver (engineer)'s action:

- **Departure order:** The driver (engineer) may depart as soon as the signal is clearly given and acknowledged.
- **Through-passage order:** The driver (engineer) may pass through the station without stopping.

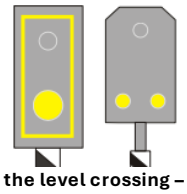
Part 5: Protections

Section 10: Signals for Level Crossings

These signals secure level crossings (BÜ) for both railway and road traffic. They may also be used in advance of crossings equipped with barriers.

Form Signal

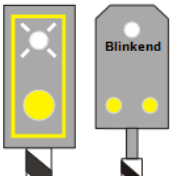
Light Signal



Signal Bü 0: Stop before the level crossing – Proceed only after protection

Driver (engineer)'s action:

- **The driver (engineer) must stop before the level crossing.** Proceed only once the crossing has been secured by protection staff, or after giving warning (acknowledge) signals and passing at slow pace (walking speed).



Signal Bü 1: Level crossing may be passed

Driver (engineer)'s action:

- The driver (engineer) may pass the crossing **without stopping**.